

REMARKS

Consideration of the above-identified application in view of the present amendment is respectfully requested. By the present amendment, claims 1, 26, 32, 35, 37, 41, 46, 52, 55, and 57-59 have been amended. New claim 62 has been added. Claims 1-41, 46, and 48-62 are pending in the application. Claims 57, 59, and 60 have been allowed.

Statement Under 35 U.S.C. §103(c)

In the Office Action, a rejection was made under 35 U.S.C. §103(a), citing US 6,325,409 B1 (Fischer) in view of US 6,227,562 B1 (Shirk et al.) and in view of US 6,176,518 B1 (Faigle). A rejection was also made under 35 U.S.C. §103(a), citing (Fischer) in view of US 6,299,199 B1 (Bowers et al.). At the time of filing, the present application and the references to Fischer, Shirk et al., Faigle, and Bowers et al. were either:

- a) owned by TRW Inc. or a company owned by TRW Inc.;
- b) subject to an obligation of assignment to TRW Inc. or a company owned by TRW Inc.; or
- c) both of the above.

The effective filing date of the present application is February 11, 2000. Fischer, Shirk et al., Faigle, and Bowers et al. are prior art under 35 U.S.C. §102(e). In accordance with 35 U.S.C. §103(c), these references are disqualified as prior art for use in a rejection under 35 U.S.C. §103(a). Therefore, the rejections of claims 1, 2, 17, 18, 19-32, 35-41, 46, 48, 52-56, 58, and 61 in the Office Action should be withdrawn.

Response to Rejections

Notwithstanding the fact that the rejections cited in the Office Action should be withdrawn in accordance with 35 U.S.C. §103(c), the rejections cited in the Office Action are also improper obviousness rejections under 35 U.S.C. §103(a).

Independent claims 1, 35, 46, 52, 55, 56, 58, and 61 each recite a stored gas inflator containing an inflation fluid consisting essentially of helium stored under pressure, and a fill tube for delivering the inflation fluid to an inflatable curtain. The fill tube directs inflation fluid into the inflatable volume of the inflatable curtain to pressurize the curtain evenly along its length initially to a first pressure, and maintains the inflation pressure above a second desired pressure, less than said first pressure, for at least the initial 5-7 seconds of inflation. The inflation fluid in the inflatable curtain has a temperature about equal to an ambient temperature for at least 95% of at least the initial 5-7 seconds of inflation. This is not taught or suggested by the prior art cited in the Office Action.

The Office Action admits that the inflation fluid in Fischer (US 6,325,409 B1) does not consist essentially of helium and states that the type of inflation fluid is application specific and does not affect the functionality of the system. The Office Action also states that the inflation fluid in Fischer would inherently have a temperature about equal to ambient temperature for at least 95%-98% of the time period. The Office Action further states that the augmented (added heat) construction of Fischer is functionally

equivalent to the recited apparatus. None of these statements are true.

As set forth in the specification of the present invention, the use of helium is critical to the present invention. To Applicants knowledge, inflation fluids other than helium will not produce the pressure and temperature recited in the claims, even if used in conjunction with the disclosed inflator and fill tube construction.

These principles are set forth in the specification of the present application on page 22, line 14 through page 28, line 13. Briefly stated, helium has a low molecular weight and a relatively high sonic flow rate compared to other gasses. Thus, at a given temperature, helium will flow through the fill tube and into the inflatable curtain faster than a gas having a higher molecular weight. This allows the required amount of helium inflation fluid to be delivered to the inflatable curtain without augmentation, such as added heat. Gasses that have low sonic flow rates compared to helium, if used in the stored gas inflator and fill tube combination of the present invention, would not produce the flow required to inflate the inflatable curtain to the required pressure in the required time without augmentation. These gasses, used in the stored gas inflator and fill tube combination of the present invention, thus would not provide the desired results of inflating the inflatable curtain to the desired pressure in the required time.

Also, the properties of helium result in a better absorption of thermal energy from the surrounding hardware,

e.g., the fill tube, for equivalent molar flow rates as compared to these other gasses. Thus, as the helium inflation fluid passes through the fill tube, it gains more heat than would the other gasses. The helium inflation fluid also loses heat quickly when it enters the inflatable curtain and quickly cools to a temperature just above ambient temperature. Thus, the inflatable curtain will experience a smaller amount of pressure loss over time due to cooling of the helium inflation fluid. As a result, the use of the stored helium inflation fluid in combination with the fill tube results in more uniform pressurization of the curtain at the desired temperatures during the initial stages of inflation.

Based on the facts set forth above, the type of inflation fluid used clearly does affect the functionality of the system. Other stored gasses will not inflate the curtain within the required time (20-30 milliseconds) without heat augmentation, which would result in the inflation fluid temperature being significantly higher than ambient. As taught by the present invention, this is undesirable because, as the heated inflation fluid cools, the curtain will lose pressure.

Also, based on these facts, inflation fluids, including helium, would not inherently have a temperature about equal to ambient temperature for at least 95%-98% of the initial 5-7 seconds of inflation unless used in a stored gas inflator in conjunction with a fill tube. Without the fill tube, the helium inflation fluid would not gain heat thermodynamically and through adiabatic compressive heating and therefore would

not inflate the curtain to a temperature about equal to ambient as quickly. Also, the other gasses do not absorb heat as readily as helium and therefore would not inflate the curtain to a temperature about equal to ambient as quickly, even if used in a stored gas inflator with the fill tube.

Furthermore, the augmented construction of Fischer clearly is not functionally equivalent to the recited apparatus. As stated above, augmentation heats the inflation fluid, which would cause the curtain to inflate to a temperature substantially above ambient.

In summary, the combination of a stored helium inflator free from pyrotechnic material for heating the helium and a fill tube having the disclosed construction provide desired inflation characteristics in terms of even pressurization, pressurization duration, and inflation temperature. Inflation fluids requiring augmentation would not provide the desired inflation temperatures. If a fill tube is not used or the fill tube has an improper construction, the curtain would not pressurize appropriately and also would not achieve the desired inflation temperatures. The structure recited in the present invention is not taught or suggested by the prior art. Therefore, the rejections under 35 U.S.C. 103(a) should be withdrawn.

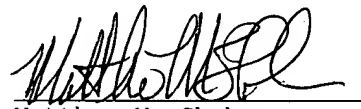
For the reasons set forth above, it is respectfully submitted that claims 1, 35, 46, 52, 55, 56, 58, and 61 are allowable. Claims 2-34 and 62 depend from claim 1 and are therefore allowable as depending from an allowable claim and for the specific features recited therein. Claims 36-41

depend from claim 35 and are therefore allowable as depending from an allowable claim and for the specific features recited therein. Claims 48-51 depend from claim 46 and are therefore allowable as depending from an allowable claim and for the specific features recited therein. Claims 53 and 54 depend from claim 52 and are therefore allowable as depending from an allowable claim and for the specific features recited therein.

In view of the foregoing, it is respectfully submitted that the above identified application is in condition for allowance, and allowance of the above-identified application is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,



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